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**Booster Parameter List** 

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# **U.S. Department of Energy**

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> Accelerator Division Technical Note

## No. 234

Booster Parameter List

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## ABSTRACT

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> THIS NOTE DESCRIBES THE PARAMETER LIST FOR THE AGS - BOOSTER. A SCHEMATIC LAYOUT OF THE LATTICE AND ITS SUPERPERIODS ARE ALSO INCLUDED.

INTRODUCTION

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In this note we describe the parameter list of the AGS - Booster. In section II the present values of the Booster parameters are tabulated. This updates the Booster parameter list given in References 1 and 2. Schematic diagram: of the lattice [3,4] showing the layout of the AGS Booster, the labling convention of the lattice and its superperiods are also included.

#### References:

- AGS Booster Conceptual Design Report, Vol.I, (April 1984);
  AGS Booster Parameter List, Y.Y. Lee, (Sept. 26, 1985).
- 2. R & D For The AGS Booster, E.B. Forsyth, (Dec. 12, 1985).
- 3. Booster Lattice, Booster Tech. Note No. 1, E. Courant and Z. Parsa, (January 15, 1986).
- 4. Booster Coordinates, Booster Tech. Note No. 3, Z. Parsa, G.F. Dell (January 1986).

### AGS BOOSTER PARAMETER LIST

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ENERGY [MeV]

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INJECTION:

PROTONS	200 MeV
POL PROTONS	200 MeV
HEAVY IONS	> 1 MeV/AMU

[POL == POLARIZED]

EJECTION (MAXIMUM)

PROTONS	1	GeV
POL PROTONS	1	GeV
HEAVY IONS	P = 5	Q/A GeV/AMU

[Q is the charge of the Heavy Ions (whether fully stripped or not) delivered from the Tandem.]

LATTICE

CIRCUMFERENCE	201.78 M (1/4 AGS)
PERIODICITY	6
NUMBER OF CELLS	24 FODO [SEPARATE FUNCTION, MISSING DIPOLES]
LENGTH	8.4075 M
PHASE ADVANCE/CELL	71.25
$\mathbf{Q}\mathbf{X} \simeq \mathbf{Q}\mathbf{Y}$	4.75
BETAX MAX/MIN BETAY MAX/MIN	13.88/3.67 M 13.67/3.80 M

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XP MAX		2.94	M
TRANSITION	GAMMA	4.795	5

#### RF SYSTEM

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NUMBER OF STATIONS

- 1 FOR PROTONS
- 1 FOR POL PROTONS
- 2 FOR HEAVY IONS

[where POL== POLARIZED]

HARMONIC NUMBER

**3 FOR PROTONS** 

3 FOR POL PROTONS

3 FOR HEAVY IONS (1 FOR RHIC)

#### FREQUENCY RANGE (MHz)

FOR PROTONS	2.5 -	3.9	
FOR POL PROTONS	2.5 -	3.9	
FOR HEAVY IONS	0.178 -	2.5 (.06	84 FOR RHIC)

## PEAK RF VOLTAGE [KV]

FOR PROTONS 35

FOR POL PROTONS 35

FOR HEAVY IONS 17

## ACCELERATION TIME [M-SEC]

FOR PROTONS 50

FOR POL PROTONS 50

e,

FOR HEAVY IONS 500

REPETITION RATE

FOR PROTONS	10 Hz (4 PULSES/AGS PULSE)	
FOR POL PROTONS	1 Hz (1 PULSE/AGS PULSE)	
FOR HEAVY IONS	1 Hz (1 PULSE/AGS PULSE)	

#### DIPOLES

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[DIPOLES ARE CURVED AND WEDGED FOR O ENTRANCE ANGLE]

NUMBER	36	
LENGTH (MAGNETIC)	2.4 M	
GAP	82.55 MM	
GAP VACUUM CHAMBER	66 MM	
GOOD FIELD REGION (<:	10 <sup>-4</sup> ) 16 X 6.6 CM	ł

INJECTION FIELD [KG]

FOR PROTONS1.56FOR POL PROTONS1.56FOR HEAVY IONS0.105 A/Q

[Q is the charge of the Heavy Ions, (whether fully stripped or not), delivered from the Tandem.]

## EJECTION FIELD [KG]

FOR PROTONS	4.0
FOR POL PROTONS	4.0
FOR HEAVY IONS	12.0

LAMINATION THICKNESS

1.5 MM [0.6 MM AROUND ENDS]

М

QUADRUPOLES	
NUMBER	48
LENGTH (MAGNETIC)	0.50375
APERTURE	16.5 CM
VACUUM CHAMBER AP.	15.5 CM

[AP = APERTURE]

INJECTION POLE TIP FIELD [KG]

FOR PROTONS	1.02
FOR POL PROTONS	1.02
FOR HEAVY IONS	0.068 A/Q

[Q is the charge of the Heavy Ions, (whether fully stripped or not), delivered from the Tandem.]

EJECTION POLE TIP FIELD [KG]

FOR	PROTONS	2.7
FOR	POL PROTONS	2.7
FOR	HEAVY IONS	7.9

LAMINATION THICKNESS 0.6 MM

FIELD QUALITY

SEXTUPOLE HARMONIC0.0 $(6 \oplus / 2 \Theta)$ (SHAPE POLE TIP TO ELIMINATE)

ALL OTHER HARMONICS  $< 10^{-4}$ 

MAX. VACUUM PRESSURE (N2 EQU.) 10<sup>-10</sup> TORR

MAX. INTENSITY (PARTICLES PER PULSE)

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FOR PROTONS	$1 - 1.5 \times 10^{13}$
FOR POL PROTONS	10 <sup>12</sup>
FOR HEAVY IONS	$2 \times 10^{11}$ / Z.

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NDTE: ALL DIMENSIONS ARE IN METERS

Fig. 1 The Booster Lattice

